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CRITERION-REFERENCED SYSTEM APPROACH TO EVALUATION OF COMBAT UNITS

Angelo Mirabella

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Submitted as complete and
technically accurate, by
Frank J. Harris
Technical Area Chief

Approved by:

A. H. Birnbaum, Acting Director
Organizations and Systems
Research Laboratory

Joseph Zeidner
Technical Director
U.S. Army Research Institute for
the Behavioral and Social Sciences

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CRITERION-REFERENCED SYSTEM APPROACH TO EVALUATION OF COMBAT UNITS

Systems engineering of training and its subsidiary criterion-referenced measurement have been invaluable tools for increasing the job-relevance of military training and evaluation. These tools have provided an indispensable point of departure and a framework for ensuring accountability. However, they have been developed within the context of relatively simple, procedural tasks that are necessary but not always sufficient for describing jobs as performed in working environments. The tools work comfortably for hard, individual skills. But the objection often heard is that the soft skills have yet to be attacked successfully with those tools. Those of us who have moved the focus of our evaluation research from the school setting to the combat unit are especially sensitive to this objection because we face the added complication of two-sided, tactical, collective behavior.

To improve the training and evaluation of such behavior, the Army Research Institute for the Behavioral Sciences (ARI) has been pursuing research on tactical engagement simulation. In addition, we have been developing a supporting system of evaluation. This paper deals with research on the evaluation system; first, let us briefly describe the engagement simulation test bed.[1]

Engagement simulation (ES) currently is a set of techniques for conducting real-time, two-sided free play, tactical exercises at the combined arms reinforced platoon level. One of its key features is a set of objective, casualty assessment methods that allow almost real-time feedback to participants. For example, a rifleman can fire at a target and register a hit by calling out a number on the helmet of the opposing infantryman. A tank gunner can similarly register a hit against another tank. Kills are relayed via radio by a controller to a net control station, which in turn radios the target that it is out of action. Suitable pyrotechnics add visual cues and, therefore, realism to the battle.[2] With these and other techniques for artillery and antitank weapons, it is possible to measure casualties over time and thereby provide for objective assessment of the outcomes of tactical performance.

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[1] Paper originally presented at the 19th Military Testing Association Meeting, San Antonio, Tex., 19 October 1977.

[2] Training Circular 71-5. REALTRAIN: Tactical Training for Combined Arms Elements. U.S. Army Armor School/U.S. Army Research Institute, January 1975.

Several years ago, when engagement simulation was developed as a training methodology, its developers felt that the evaluation problem for unit training had been solved, because objective measures of casualties were now available. What else was needed? However, an alternative view held that a great deal else was needed: that the engagement simulation test bed had opened up a Pandora's box with respect to the measurement and interpretation of unit combat performance. This alternative view argued for a system of evaluation which included, at least, concern for process measurements and a scheme for uncovering the patterns and relationship among these two sets of measures, taken continually through a training exercise, plus other major features.

This discussion outlines what an adequate system of evaluation might look like for the engagement simulation test bed and mentions some of our research experiences with various parts of the system (see Figure 1). To proceed logically and efficiently through the development of an engagement simulation relevant evaluation system, we begin with the development of a model or model(s) to define

- Measurement concepts,
- Data processing concepts, and
- Data interpretation concepts.

These concepts are consistent with the purposes for measuring and assessing performance in the first place. It is at this point that evaluation aims and philosophical biases can be put on the line. If the major purpose of evaluation is diagnostic feedback in support of a training system, that purpose can be made explicit and the rest of the system designed accordingly. This last statement may seem obvious and self-evident, but in practice it may not be so obvious. One of the philosophical problems with the Army Training and Evaluation Program (ARTEP)[3] is that it does not adequately distinguish between evaluation for training diagnosis and evaluation for accountability. A result has been that many commanders regard ARTEP as a report card in spite of guidance to the contrary from the Army Training and Doctrine Command (TRADOC). This observation, which came out of a current ARI study, suggests at least one fundamental problem with ARTEP as a training model.[4]

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[3] ARTEP 71-2. Army Training and Evaluation Program for Mechanized Infantry/Tank Task Force, June 1977.

[4] Human Sciences Research, Inc. Interim Report (Revised), Improved Army Training and Evaluation Program (ARTEP) Methods for Unit Evaluation, 21 October 1977.

Steps in development of system:

1. Develop a model or model(s) to define:
   - Measurement concepts
   - Data processing concepts
   - Data interpretation concepts
2. Define data requirements and develop processing methods
3. Define and develop data collection methods
4. Define, develop, performance benchmarking techniques, i.e., standards.

Figure 1. Engagement simulation evaluation system.

The next step in system development would be to define the data requirements and data processing methods that are needed to fit the model or model(s) constructed in step 1. If, for example, in step 1 you decide that information about patterns of tactical movement is useful for diagnostic purposes, that would suggest a need to know what fire elements are where and when. You would need to go further and decide how much information on position location is needed and how accurate it needs to be.

Now you face step 3, which requires that you define the methods for collecting the data identified in step 2. If you are not yet familiar with the realities of collecting objective performance data under field operational conditions, you would soon learn about them at this stage of system development.

Finally, step 4 defines the performance benchmarks or standards that make your system criterion-referenced. This is probably the most difficult step of all. It has been sidestepped to a large extent by ARTEP through the use of expressions such as "Casualties shall not be excessive," with the definition of the benchmark being left to the evaluation team. ARTEP has also sidestepped the criterion issue by using mostly procedural standards, which are at a more global level than those in the old Army Training Tests but which are still procedures-based.

We can now review some areas of progress that ARI has made in contributing to such a criterion-referenced system.

1. Modeling. As part of a long-term effort to validate engagement simulation training, new experimental versions of ARTEP are being produced. These were produced specifically for some developmental tests at Fort Carson, Colo., in January 1978. Accordingly, they were designed for reinforced platoon missions, i.e., for tank platoons with supporting infantry squads and tube-launched, optically tracked, wire-guided (TOW) missiles.

For those not familiar with ARTEPs, Figure 2 shows a typical page, from ARTEP 7-45 FOR MECHANIZED INFANTRY AND COMBINED ARMS TASK FORCE. Look particularly at the column labeled Training/Evaluation Standards. Phrases like "Coordination...will support...," "must be responsive," "without sustaining excessive casualties," place a substantial responsibility on the evaluator. In Figure 3, a roughly comparable version of an engagement simulation ARTEP, you can see at least two major revisions in ARTEP concept.

- The standards and the rating columns have been eliminated. In their places are a performance data and results section. The measures are quantitative: time, range, casualties.

UNIT: Company/Teams

MISSION: Deliberate Daylight Attack

TASK	CONDITIONS	TRAINING/EVALUATION STANDARDS
Eliminate enemy resistance	Enemy engages lead elements of the TF when they are within antitank range of his position (e.g., 1,000 - 2,000 meters).	A. Coordination of mortar, machinegun, antitank, and nonorganic fire support will support the scheme of maneuver (i.e., fire must begin, be shifted, and be stopped as specified in the order and must be responsive to requests from maneuver platoons). B. Company/team elements use proper fire and maneuver techniques to eliminate enemy resistance. Objective is secured without sustaining excessive casualties and vehicle losses. (Evaluator judgment.)

Figure 2. Training and evaluation outline.

UNIT: Company/Team MISSION: Attack

TASK/SUBTASK	CONDITIONS	PERFORMANCE DATA	RESULTS
Execute the attack (tanks)	Enemy force defends		
Cross the LD		Time tanks cross LD	
Tanks move by covered and concealed route to attack		Tank casualties during movement	
Tanks detect the enemy at maximum range		Time of detection Detection range	
Tanks engage the enemy at maximum range		Engagement range	
Tanks engage the enemy		Casualties: Opposition Own	
		Key personnel Personnel Weapons disabled Vehicles immobilized	
Execute the attack (INFANTRY)			
•			
•			
•			

Figure 3. Training and evaluation outline.

- Major objectives have been further analyzed into intermediate objectives. For example, the task of eliminating enemy resistance has been analyzed into the weapons systems involved and then further broken down into weapon systems subtasks.

What has happened to the standards? This particular model of ARTEP candidly admits that we don't know how to handle the standards problem yet and moves the problem to one side, until scientific progress in this area provides some useful methodology. Emphasis shifts here away from GO/NO-GO type of evaluation. Emphasis is placed instead on obtaining a rich, detailed description of the behaviors involved in two-sided combat.

That emphasis leads to two essential questions. The first is "What patterns of behavior can we extract from the various performance measures which will have diagnostic value?" We have, for example, a particular interest in showing the connection or correlations among tactical movements, processes such as first enemy detections and outcome measures such as casualties inflicted or sustained.

The second question is, "What performance tradeoffs can we identify and measure?" A commander may deliberately sacrifice cover and concealment in order to fight more aggressively or move more quickly toward some tactical objective. The significant and diagnostically useful measurement concept would be risk-taking behavior, instead of just cover and concealment.

Again we ask "What has happened to standards?" They have not been forgotten. Until the standards problem is solved, an evaluation system is not criterion-referenced. But we have concluded that some imaginative and fresh thinking is required, along with supporting research. The concept which we are currently working on can be described as situation-specific forecasting of the dynamics of an engagement simulation exercise, along with various tactical processes and outcomes such as casualties.

2. Data Requirements. The second step in developing an evaluation system is to define performance data requirements and data processing techniques. The modeling (step 1) can provide the general guidance for the second step. But more specifically, our approach has been to identify essential elements of analysis (EEA) and then to produce measures of effectiveness (MOE) by phase of combat. This is consistent with the ES ARTEP model. Under contract to ARI, Human Systems, Inc. (HSI), has generated a computer listing of EEA's along with methods for coding, processing, and displaying the results of a computer analysis of a

tactical map.[5] Figure 4 shows the initial list that HSI generated. What the data file does, in effect, is to describe and display the tactical movements of two opposing combat teams, Alpha and Bravo, involved in an ES exercise. The list indicates which fire elements are in what locations, at what time, what the terrain is like, whether or not there are targets of opportunity, and what casualties result from direct and indirect fire.

These EEA's were put together in various ways to provide MOE's for each of the phases of reinforced platoon attack mission. This mission was the basis for a developmental test at Fort Carson in January 1978. The phases were

1. Preparation (i.e., Planning),

2. Pre-Engagement (i.e., Movement to Contact),

3. Engagement (Hostilities), and

4. Post-Engagement (Post-Attack Security).

Some examples of measures of effectiveness are shown in Figures 5 and 6. Figure 5 shows an MOE for Tactical Formation in the Pre-Engagement Phase. Figure 6 shows an example from the Engagement Phase. In this case, an MOE for enemy detection is illustrated.

The methods for processing data in the HSI/ARI data file are somewhat constrained by their small quantity. Tactical exercises (unlike most individual tasks) require several hours to whole days to complete and are very costly in manpower and supplies. Consequently, data are relatively scarce and do not readily lend themselves to sophisticated multivariate analysis. Therefore, until a large data base is built up, we will probably not be able to do much beyond cross-tabulations of frequency counts. This is the tack we have been taking so far. Such a tack is consistent with our near-term goal, which is to build up experience with objective measurement of tactical exercises and to learn which measures are most useful for diagnosis of training deficiency.

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[5] Hansen, D. N. & Drewfs. Small Unit Data Input Structure and Graphic Support System. Interim Report. Human Systems, Inc., 28 June 1977.

1. Team membership
2. Trajectory force mix
3. Trajectory identification number
4. Trajectory path hex number
5. Elapsed exercise time
6. Hex terrain type
7. Trajectory mode
8. Communications
9. Trajectory plan versus actual hex position
10. Trajectory overwatch placements
11. Trajectory potential fire fan and coverage fire fan
12. Trajectory movement rates
13. Target of opportunity index
14. Attack effectiveness (direct fire effects)
15. Incoming indirect fire effects

Figure 4. EEA's being addressed by engagement simulation data file.

Exercise Phase: Pre-Engagement

Measurement Concept: Tactical Formation

MOE: What number of sub-deployments (partitions) are ordered and/or initiated in term movement to contract?

What specific sub-deployments of what specific force mixtures were made where, when, and maintained for how long? Under what conditions?

EEA's: Group identifiers, trajectory-tributary number, force mixture, team identifier, hex number, and time.

Figure 5. Examples of measures of effectiveness.

Exercise Phase: Engagement

Measurement Concept: Detection of Enemy Forces

MOE: What targets were detected by whom, when, in what sub-unit, having what force mix, in what sub-deployed partition, headed where?

EEA's:

Target type,

Target number,

Detector type,

Detector number,

Time,

Locations of target,

Location of detector.

Figure 6. Example of measure of effectiveness.

3. Data Collection Methods. Having defined data requirements in step 2, and having suggested some modest data processing approaches, in step 3 we must define data collection methods. From a technological point of view, collection of position location information is our greatest problem. The problem is very critical because position location, i.e., tactical trajectory, is the foundation of the HSI/ARI data subsystem. And without good position data, that subsystem is a house of cards.

When we began researching the ES evaluation problem several years ago, we anticipated access to Army instrumented ranges. We soon discovered that such ranges were few, far between, expensive to operate, and mostly unavailable. Consequently we began a small study of low-cost portable alternatives to such facilities as those at the Combat Developments Experimentation Command and at Fort Hood. The study was particularly geared to supporting the Fort Carson test. The study, by Behavior Technology Consultants, Inc., looked at optical triangulation, optical ranging, unattended ground sensors, and a number of radio-ranging techniques. It recommended a radar-ranging system, which was portable, relatively low-cost, and sufficiently accurate but which was still beyond our resources (and which could not be put together in time for Fort Carson anyway).[6] Hence we developed some labor-intensive strategies for plotting tactical movements. These involved intensive map and terrain training of data collectors, and systematic cross-checking of results. In addition, the HSI methodology included some techniques for screening bad position data and estimating missing points.

If we can succeed in adequately solving the dilemmas posed by steps 1, 2, and 3 of an ES evaluation system, we will have achieved a great deal. However, we will still not have, in my opinion, a criterion-referenced system. Being able to collect various kinds of process and product data and being able to relate these data to each other are critical issues. But their interpretation and usefulness for training diagnosis are incomplete without performance benchmarks or standards. The problem of standards has been avoided for two-sided combat training exercises because such exercises are situation-specific and involve a complex and not very well-understood set of variables.

4. Performance Standards. Accordingly, we have underway a basic research program to explore the standards problem. This effort stems in part from a model developed several years ago by Litton under contract to ARI. This model, the Unit Performance Assessment Model (UPAM), used the policy capture technique to generate indices of combat proficiency.

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[6] O'Heeron, M. K., Howell, W. Y., Frazier, T. W., & Johnson, E. Field Measurement and Data Collection System for Engagement Simulation Field Exercises. Final Report. Behavior Technology Consultants, Inc., 1 October 1977.

The index values resulted from a linear combination of variables, mostly reflecting various casualty measures. Commanders' forecasts of these measures for an upcoming exercise were to provide benchmarks against which actual data were to be compared.

A more recent modeling effort is called Combat Operations Training Effectiveness Analysis (COTEAM). This effort picks up on the concept of situation-specific forecasting to provide performance benchmarks, but develops the concept further in some ways we think are quite significant. COTEAM hopes to do several key things:

1. Define methods for forecasting products, processes, and dynamics of ES exercises in a situation-specific context. The UPAM system required forecasting but left the problem up to the CO's own devices.

2. Separate nontraining effects such as terrain, mission type, and force ratios, from training effects by addressing two kinds of benchmarks: training-system referenced and combat referenced.

The curve in Figure 7 suggests why two types of benchmarks are needed. Imagine that you could unambiguously define training system benchmarks (1-5) representing various points in a training cycle, e.g., 1 = entry level performance, 5 = final stage in unit training. Now imagine that you could define various sets of operational conditions (S_1, S_2, S_2) where such variables as weapon mix, terrain type, doctrine, force ratio define the sets. Further imagine that we could generate performance curves as functions of training level and operational condition set. What conclusions could you draw from Figure 7?

1. The conditions of S_1 are such that training effects are completely overwhelmed. As a training manager you would avoid S_1 because it does not allow for a differentiation across levels of training.

2. S_2 and S_3, on the other hand, would both be potentially useful to the training manager.

3. The individual who sits above the training manager and balances training, force development, and doctrine would probably exclude both S_1 and S_2 as potential training conditions, because neither set of conditions permits training to bring combat units up to an acceptable level of readiness.

There are at least five methods for generating the benchmark curves:

1. ARTEP evaluator/controller (E/C) estimations

2. Use of the Delphi technique by military experts

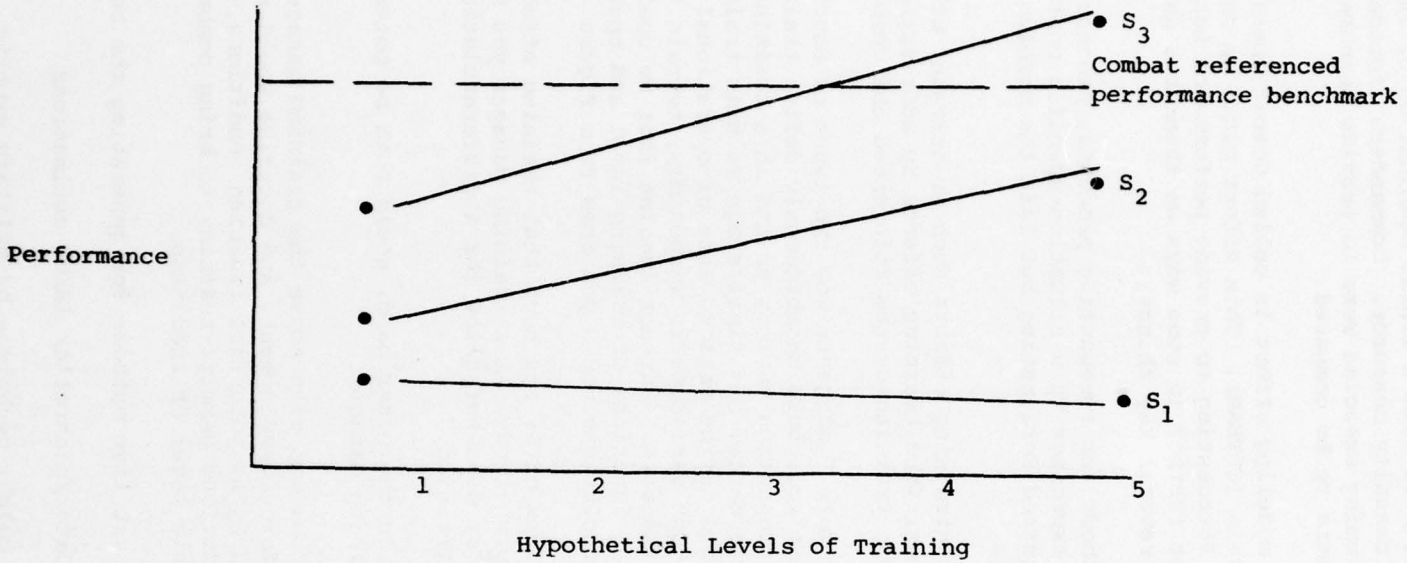

Figure 7. Example of performance benchmarks referenced to training system and combat.

3. Board games

4. Analytic math models such as Lancaster and HERO

5. Computer simulation.

We developmentally tested the first method, E/C estimation, during a validation of rifle squad engagement simulation in April 1977 at Fort Ord, Calif. Figures 8-11 document this pilot effort.[7]

Figure 8 shows the scenario and instructions that were given to subjects for a squad movement to contact. The subjects were NCO's acting as squad leaders.

Figure 9 shows the kinds of forecasting that the NCO's did, and the data that resulted. Figures 10 and 11 show scenario, instruction, and resulting data for a hasty defense. Generally, our impression was that forecasting could be done with some reliability and that the task of forecasting for different assumed training levels was not insurmountable. Our subjects did seem to be able to discriminate expected tactical performance across assumed training levels.

The third method, board gaming, was explored during the combined arms test of engagement simulation.[8] A company-level game was specially designed with ES rules, using measures being taken during concurrent field exercises. Results of the two sets of measurements were very similar and therefore provided preliminary support for the usefulness of games as techniques for generating baseline data.

This paper provides only a broad and very surfacial view of a complex research program; it does not reveal the scope of effort involved. Some indication of the size of the effort is its staffing. Approximately 16 ARI behavioral scientists with advanced degrees are partially or fully involved with the program. They are supported by the services of four private behavioral research companies. The very active and indispensable support of our TRADOC sponsors probably adds another 5 professional man-years.[9]

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[7] The materials in Figures 8-11 were prepared and administered by Dr. F. H. Steinheiser of ARI.

[8] Medlin, S. M. Behavioral Forecasting for REALTRAIN Combined Arms. ARI Technical Paper in preparation.

[9] Our sponsors are the Training System Manager for Tactical Engagement Simulation Systems, Fort Eustis, Va., and The Directorate of Training Developments, Fort Knox, Ky.

What the payoff for this effort will be, we cannot predict. But its significance lies at least partially in its potential contribution to the Army's proposed National Training Center at Fort Irwin, Calif. Large sums of money are likely to be invested in the production of a very sophisticated instrumented range, capable of generating enormous quantities of high resolution data. If the Army's capacity to select, process, and interpret those data for training purposes does not match its capacity to supply the hardware and engineering involved in instrumenting a range, the Fort Irwin concept may not reach its full potential.

10 man attacking squad (testing squad)

4 man (standard) defense

Scenario: A ten-man squad is the point element of the platoon in a movement to contact. The squad will know that they can expect contact at any moment. They will have just crossed a danger area where they encountered sniper fire, without taking any losses. The squad is now approaching an enemy OP, consisting of four men with a machine gun in well concealed positions. Time t = 0 occurs as the squad clears the danger area.

Instructions

Your own opinions and estimates are being requested. This is NOT a test of your personality; the data will be used strictly for scientific purposes.

Assume that all members of your squad have only been through Basic Combat Training (BCT). Now on the next two pages, go down the first (BCT) column, and put your answer in each box for each question. If a more detailed answer is called for, use the reverse side of the paper.

Now assume that your squad has recently passed Infantry Level 2 ARTEP, shown in column two. Answer each of the questions again for this column.

Assuming three days of SCOPES training, answer the questions again in the third column.

Finally, assume that all members of your squad are combat experienced Rangers, and answer all questions in the boxes for the fourth column.

Figure 8. Movement to contact against an OP.

Question	Level of Training of Tested Squad: Only BCT	Passed Level 2 Infantry ARTEP	Passed Level 2 ARTEP, and 3 or more days of SCOPES Training	Combat experienced Rangers
1. Maximum distance (meters) between fire teams.	11.3# 7.4*	19.6 8.7	21.7 12.5	34.3 18.4
2. Minimum distance (meters) between fire teams.	7.6 7.8	17.7 13.7	20.5 15	30.8 14.8
3. How many meters will the point man be in front of the squad.	11.8 10	21.9 14.8	26 14	40.6 23
4. What will be the distance (m) between the right and left flanks?	18 14	31 20	34 20.4	42.5 27.8
5. Will the OP be detected prior to anyone crossing Phase Line C?	no - 7 yes - 1	no - 4 maybe - 4	no - 2 maybe - 6	no - 2 yes - 6
6. What will be the approximate range at initial detection by the OP? (m)	88 19	71 40.4	80 54.5	62.6 53.2
7. Will the OP be detected prior to anyone opening fire?	no - 7 yes - 1	no - 2 yes - 2 maybe - 4	no - 1 yes - 4 maybe - 3	no - 1 yes - 7
8. How many minutes do you think will elapse before the squad will be detected by the OP?	5.3 5.8	7.1 8.2	7.4 9.8	14.6 13.3
9. How many OP casualties do you think there will be?	2 1.6	1.7 .9	2.5 .8	3 1.5

Note. #--top value is the mean of 8 respondents; * is the standard deviation from that mean.

Figure 9. Forecasts of infantry squad movement to contact.

Question	Level of Training of Tested Squad: Only BCT	Passed Level 2 Infantry ARTEP	Passed Level 2 ARTEP, and 3 or more days of SCOPES Training	Combat experienced Rangers
10. What percent chance do you think the squad has of taking the OP?	17.8 21.2	45 23	68 11.1	88.4 13.2
11. How long do you think the exercise will last if the squad takes the OP? (min)	37.5 24	32 15.6	21.4 13.2	27.6 21.4
12. If we divide the duration of this exercise into quarters, how many casualties do you think the squad will sustain during the first quarter?	2.9 1.4	2.2 .5	1.5 .5	1.3 1.1
13. How many casualties during the second quarter?	1.8 .5	.5 1	1.4 1	1.4 1.5
14. During the third quarter?	1.9 1.1	1.5 1.1	1.1 1.2	.9 1.3
15. During the last quarter?	2.3 .8	1.9 1.5	1.8 1.5	1.6 1.9

Figure 9. Forecasts of infantry squad movement to contact (cont).

7 man attacking squad (controlled aggressor)

10 man defending squad (tested squad)

Scenario: A ten-man squad established a hasty defense as part of a larger platoon defensive perimeter. They will have approximately 15 minutes from the delivery of the frag order to establish the hasty defense. At that time an enemy counterattack, consisting of 7 men with a machinegun will begin their approach toward the defensive positions. The counterattack movement will begin at a position approximately 100 meters from the defense. Time t = 0 occurs with the delivery of the frag order.

Instructions

Your own opinions and estimates are being requested. This is NOT a test of your personality; the data will be used strictly for scientific purposes.

Assume that all members of your squad have only been through Basic Combat Training (BCT). Now on the next two pages, go down the first (BCT) column, and put your answer in each box for each question. If a more detailed answer is called for, use the reverse side of the paper.

Now assume that your squad has recently passed Infantry Level 2 ARTEP, shown in column two. Answer each of the questions again for this column.

Assuming three days of SCOPES training, answer the questions again in the third column.

Finally, assume that all members of your squad are combat experienced Rangers, and answer all questions in the boxes for the fourth column.

Figure 10. Hasty defense.

Question	Level of Training of Tested Squad: Only BCT	Passed Level 2 Infantry ARTEP	Passed Level 2 ARTEP, and 3 or more days of SCOPES Training	Combat experienced Rangers
16. Describe, on the enclosed sheet of paper, what you think the defending squad's reaction to attack will be.				
17. The overall tactical performance of the defending squad will be, on a scale from 1 (excellent) to 7 (extremely poor):	6.# 1.*	4.3 .1	3.4 1.4	2.5 2.3
18. The overall control of the squad during this exercise will be from 1 (excellent) to 7 (extremely poor):	5.4 1.5	4.2 .1	3.7 1.4	2.9 2.6
19. If detection is made before contact was initiated, what will be the range of detection? (m)	85.5 62.2	119 62.8	136 63.7	158 86.2
20. What will be the range of the OPFORS when contact is initiated? (m)	76.8 66.5	80.2 75.7	82.8 70.7	88.3 91.4
21. Which side do you think will open fire first?	Defense: 6 Attacker: 2 ? = 1	Defense: 6 Attacker: 2 ? = 1	Defense: 7 Attacker: 1 ? = 1	Defense: 8 Attacker: 1
22. At what range do you think the OPFORS will be detected? (m)	46.4 79	80. 72.5	81 76	110 113

Note. #--top value is the mean of 8 respondents; * is the standard deviation from that mean.

Figure 11. Forecasts of squad hasty defense.

Question	Level of Training of Tested Squad: Only BCT	Passed Level 2 Infantry ARTEP	Passed Level 2 ARTEP, and 3 or more days of SCOPES Training	Combat experienced Rangers
23. What percent chance do you think the squad has to hold its defensive position?	28 32	59 23	56 20	84 19
24. How long do you think the squad will hold, before (if) they are overrun? (min)	12.1 13.7	26 19.9	32.6 28.3	34.8 24.5
25. How long do you think this exercise will last if the squad successfully defends their position? (min)	DATA UNUSABLE BECAUSE OF MISUNDERSTANDING			
26. If we divide the duration of this exercise into quarters, how many casualties do you think the squad will sustain during the first quarter?	2	2	1	1
27. How many during the second quarter?	2.5	2	1	1
28. During the third quarter?	2.5	2	1	1
29. During the last quarter?	2	2	1	1

Figure 11. Forecasts of squad hasty defense (cont).